WTI Part No. 13027
Rev. B

CMS-16

Console Management Switch

User's Guide

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⚡ Warnings and Cautions: ⚠

No Serviceable Parts Inside; Authorized Service Personnel Only

Do not attempt to repair or service this device yourself. Internal components must be serviced by authorized personnel only.

- **Shock Hazard - Do Not Enter**
- **Choc Hasard - N'entrent**
- **Schocke Hazard - Test Nicht Betrete**
- **Otro Hazard - Do Non Entrano**

Nameplate Power Warning

This device should only be operated with the type of power source indicated on the instrument nameplate. If you are not sure of the type of power service available, consult your local power company.

- **Connect unit only to a properly measured supply. Use only three wire cord which is provided with the unit.**
- **Abouchent unité qu'aux convenable mesura approvisionnement. Usage qu'à trois fil corde laquel est approvisionna avec la unité.**
- **Anschliesse einheit nur bis ein angebracht gemessen nachschub. Gebrauch nur drei draht schnur welche ist verschaffen mit das einheit.**
- **Connect unità solo a un proper misurata fornirle. Adoperano solo tre wire spago quale è fornii con gli unità.**

Battery Replacement

This device may include a lithium battery powered circuit. If the battery is incorrectly replaced or mistreated, there is a danger of explosion and a risk of personal injury. Do not attempt to recharge the battery, disassemble it, immerse it in water, or dispose of it in a fire. Battery replacement may only be performed by authorized service personnel.

Rack Mount Installation

When installing this device in an instrument rack, the following factors must be accounted for:

1. **Enclosed Racks:** Enclosed racks must provide adequate ventilation. Make certain that the rack is not overly crowded and note that each unit in the rack generates its own heat. An enclosed rack should have louvered sides and a fan to circulate cooling air. The maximum temperature for the equipment in this environment is 45° C.

   When mounting the unit in an enclosed rack with a ventilation fan at the top of the rack, note that excessive heat generated by devices at the bottom of the rack can be drawn upward and into the ventilation slots of units located at the top. Make certain to provide adequate ventilation for equipment installed at the bottom of the rack.

2. **Open Racks:** Make certain that the rack frame does not block the ventilation slots on the instrument cover. If the device is installed on sliders, check the unit when seated all the way into the rack to make certain that ventilation slots are not blocked.

Ventilation

Slots in the instrument cover are provided to allow ventilation for heat dissipation. To ensure safe, reliable operation, these openings must not be covered or blocked.

Disconnect Power

If any of the following events are noted, immediately disconnect the unit from the outlet and contact qualified service personnel:

- If the power cord becomes frayed or damaged.

- If liquid has been spilled into the device or if the device has been exposed to rain or water.

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1.   Introduction

The CMS-16 Console Port Management Switch provides secure, in-band and/or out-of-band access to RS232 console ports and maintenance ports on UNIX servers, routers and other network equipment. System Administrators can access remote devices in order to change configuration parameters, connect users to restricted ports, collect buffered data, and perform a variety of other administrative functions.

Versatile Connectivity
Up to 16 different devices can be connected to the CMS without the need to select a common baud rate or parity. Each port can be individually configured for specific baud rates, parity, handshaking, and various other parameters and options.

Easy Set-Up and Operation
Configuration of the CMS is simple. A menuing system is used to select parameters, and enable options. The CMS can easily adapt to the requirements of almost any data communications application.

Limited Command Access
The CMS is ideal for situations that require limited access to important commands. Two security levels allow each port to function as a Supervisor Port or User Port, depending on the password entered at login. Supervisor Ports are allowed to change configuration, display status, and connect to any other port; User ports are only allowed to connect to the ports provided by their password. Each individual port can be assigned its own unique, user-defined password, up to sixteen characters long.

Non-Volatile Memory
If AC power to the unit is lost or interrupted, the CMS's non-volatile memory will retain user-defined parameters and port connections.

Modem and Telnet Communication
The CMS can be controlled by a local PC that communicates with the unit via cable, or controlled remotely via external modem or telnet connection. Your terminal emulation or telnet program is used to send commands to connect ports or display status.

Configuration Backup
Once you have configured the CMS to fit your application, parameters and options can be saved to an ASCII text file on your PC. This allows you to quickly restore user-selected parameters if the unit configuration is accidentally altered or deleted. Saved parameters can also be uploaded to other CMS units. This allows rapid set-up when several units will be configured with identical or similar parameters.

Typographic Conventions

Throughout this User's Guide, typefaces and characters are used to denote the following:

^ (e.g. **^X**)	Indicates a control character. For example, the text "**^X**" (Control X) indicates the **[Ctrl]** key and the **[X]** key must be pressed simultaneously.

COURIER FONT	Indicates characters typed on the keyboard. For example, **/E** or **/P 02**.
[Bold Font]	Text set in bold face and enclosed in square brackets, indicates a specific key. For example, **[Enter]** or **[Esc]**.
< >	Indicates required keyboard entries: For Example: **/P <n>**.
[ ]	Indicates optional keyboard entries. For Example: **/W [n]**.

2.   Unit Description

2.1.   Front Panel
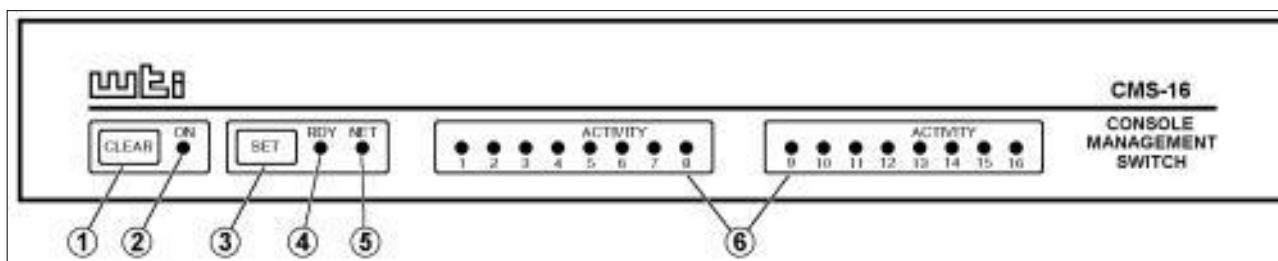
Figure 2.1:   Instrument Front Panel

1. **CLEAR:** Restarts the CMS operating program without changing user-selected parameter settings or breaking port connections.

2. **ON:** Lights when AC Power is applied.

3. **SET:** Used to Initialize the CMS to defaults specified by the SetUp Switches. To initialize, press and hold both the SET and CLEAR buttons, release only the CLEAR button, wait for the Port LEDs to flash, and then release the SET button.

Note:
- During initialization, all port LEDs will flash ON three times.
- During initialization, all command-selected parameters will be cleared, and the CMS will revert to the default parameters specified by the Option Switches.

4. **RDY:** (Ready) Flashes to indicate unit is operational.

5. **NET:** Lights when a Network Connection is present.

6. **ACTIVITY LEDs:** Light to indicate data activity at the corresponding port. The CMS-16

includes sixteen Activity LEDs, and the CMS-8 includes eight Activity LEDs.

2.2. Back Panel
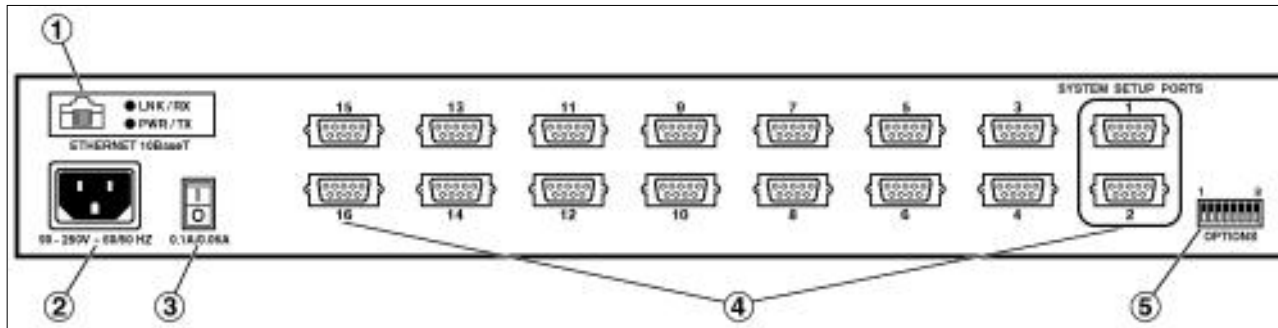
Figure 2.2:   Instrument Back Panel

1. **Network Port:** An RJ45 Ethernet port for connection to your TCP/IP network. To communicate via network, you must first specify the IP Address, Subnet Mask, and Gateway Address as described in Section 5.5.4.

2. **Power Cable Receptacle**

3. **Power Switch**

4. **RS232 PORTS:** For connection to console ports on target devices. Standard DB9 connectors configured as DTE ports. The RS232 ports are similar to a serial port on a PC. When connecting a modem, use a standard serial cable. When connecting a PC or other DTE device use a null modem cable.

   - Ports 1 and 2 are System Setup Ports, which are used for communication during set-up and configuration. Note that Supervisor Level command access cannot be disabled at these ports.

   - Ports 1 and 2 can either be connected to a PC or modem. Connection to a modem allows control by a remote PC.

5. **Option Switches:** A bank of eight DIP switches, which are used to set the default baud rate, handshake, message type, and duplex mode. Option Switch functions are described in Section 4.2.

3.   Getting Started

This section provides a brief overview of basic CMS capabilities, and describes simple tests that

can be used to determine if the unit is operating properly.

3.1. Communication Parameters

The Option Switches, located on the instrument back panel, select default operating settings. Switch functions are summarized in Section 4.2, and on a label on the CMS unit.

When the unit is shipped from the factory, the Option Switches are set for 9600 baud, 8 Bits-No Parity, RTS/CTS handshaking, verbose response, and command echo ON (all switches Down).

For this overview only, use the default switch configuration. Set your communications program (e.g. ProComm©) to the parameters listed below. After completing this overview and installing the unit, please refer to Section 5 for instructions on selecting faster communication speeds and other parameters.

- 9600 Baud
- RTS/CTS Handshaking
- Full Duplex (Command Echo ON)
- 8 Bits, No Parity, 1 Stop Bit

Using Other Parameters for this Overview (Optional):
If desired, the CMS can match the parameters used by your communications program. Refer to Section 4.2 and configure Option Switches accordingly. After changing the switches, reset the CMS; press and hold both the SET and CLEAR buttons, release only CLEAR, wait for the Port LEDs to flash, and then release the SET button.

> **Note:** If Option Switches are changed, new settings will not take effect until the unit is reset.

3.2. Apply Power to the CMS

Connect the CMS to an appropriate power source. Press the Power Switch ON. The ON LED should light, and the RDY LED should begin to flash. When connecting power to a DC unit, please refer to the additional instructions in Section 4.1.

> **CAUTION: This device should only be operated with the type of power source indicated on the instrument nameplate. If you are not sure of the type of power service available, please consult your local power company.**

3.3. System SetUp Ports

In order to ensure access to important command functions, Ports 1 and 2 are designated as System SetUp Ports; the Supervisor Mode cannot be disabled at these ports. Ports 1 and 2 will always allow password protected access to all CMS command functions, even when the unit has been reset to the default state.

Therefore, Ports 1 and 2 are generally used for communication during initial set-up and configuration, or after the unit has been reinitialized (reset) to default parameters.

> **Note:** For more information on System SetUp Port capabilities, please refer to Section 5.2.

3.4.   Connecting your PC to the CMS

The CMS can either be controlled by a local PC that communicates via cable, controlled via external modem, or controlled via TCP/IP network. For this overview, a local PC running ProComm (or a similar communications program), will be cable connected to Port 1.

> **Note: Communication via Modem (Optional):** If desired, this overview can also be performed via modem. Section 4.4 describes the procedure for connecting a modem to the CMS.

1. Attach a standard null modem cable to your PC COM port. Make certain to connect to the COM port used by your communications program.

2. Connect the other end of the cable to CMS Port 1. For a description of the port interface, please refer to Appendix A.

3.5.   Communicating with the CMS Unit

Perform the following procedure to access the CMS Command Mode, explore basic features, and check for proper operation.

1. Start your communications program (e.g. ProComm) and set it to 9600 bps, 8 bits, no parity, 1 stop bit.

2. Press **[Enter]** to access the CMS Command Mode.

   . In order for **[Enter]** to be recognized as a wake-up command, it must be pressed *without* any characters preceding it.

   b. If you have already hit other keys, press **[Enter]** twice. The "CMS>" prompt should appear.

   c. (Optional) If you are performing this overview via modem, please refer to Section 5.1 for additional instructions.

3. The Port Status Screen will be displayed, followed by the "CMS>" prompt, indicating that you have successfully accessed the Command Mode. If the "CMS>" prompt is *not* displayed, this may indicate a communication problem. Check the following:

. **Cable Connection:** Check the connection between the CMS and the PC. Make certain the cable connectors are firmly seated.

b. **Communication Parameters:** Make certain the CMS and ProComm are using the same baud rate.

4. **Help Screen:** Type **/H [Enter]** to display the Supervisor Level Help Screen (Figure 3.1).

```
COMMAND MENU

DISPLAY                                    CONFIGURATION
/S[P]         Port Status                  /F      System Parameters
/SD           Port Diagnostics             /P [n]  Port Parameters
/W[P] [n]     Port Parameters (Who)        /N      Network Parameters
/J            Site ID                      /I      Default & Test
/SN           Network Status               /UF     Upgrade Firmware
/H            Command Menu (Help)          /CP     Copy Port
Parameters


CONTROL
<Enter>           Enter Command Mode       +----------------------+
/X                Exit Command Mode        | n    Port # or Name  |
/C <n> [n]        Connect Local [Remote]   | *    All             |
/D <n| ... |*>    Disconnect               | |    "or"            |
/E <n| ... |*>    Erase Buffer             | <>   Required Entry  |
/U                Send Parameter File      | []   Optional Entry  |
/T                Reset Network Interface  +----------------------+

/D, /E, /I, /T Commands:  Add /Y to bypass "Sure (Y/N)?"
```

Figure 3.1: The Supervisor Level Help Screen

5. **Port Status Screen:** Type **/S [Enter]** to display the Port Status Screen (Figure 3.2), which summarizes conditions at all Ports. The various fields of the Port Status Screen are explained in Section 6.1.

```
PORT STATUS:    Version 1.02,   Site ID: (undefined)

PORT |       NAME        |     PASSWORD      | STATUS | MODE | BUFFER COUNT
-----+-------------------+-------------------+--------+------+-------------
 01  | (undefined)       | (undefined)       |  Free  | Any  |            0
 02  | (undefined)       | (undefined)       |  Free  | Any  |            0
 03  | (undefined)       | (undefined)       |  Free  | Any  |            0
 04  | (undefined)       | (undefined)       |  Free  | Any  |            0
 05  | (undefined)       | (undefined)       |  Free  | Any  |            0
 06  | (undefined)       | (undefined)       |  Free  | Any  |            0
 07  | (undefined)       | (undefined)       |  Free  | Any  |            0
 08  | (undefined)       | (undefined)       |  Free  | Any  |            0
     |                   |                   |        |      |
 09  | (undefined)       | (undefined)       |  Free  | Any  |            0
 10  | (undefined)       | (undefined)       |  Free  | Any  |            0
```

```
 11  | (undefined)         | (undefined)         | Free  | Any  |            0
 12  | (undefined)         | (undefined)         | Free  | Any  |            0
 13  | (undefined)         | (undefined)         | Free  | Any  |            0
 14  | (undefined)         | (undefined)         | Free  | Any  |            0
 15  | (undefined)         | (undefined)         | Free  | Any  |            0
 16  | (undefined)         | (undefined)         | Free  | Any  |            0

Enter /H for Command Menu
```

Figure 3.2: The Port Status Screen (Defaults Shown)

6. **Port Connection:** The CMS can perform two different types of port connections; Resident Connections and Third Party Connections.

  . **Resident Connection:** Your resident port (e.g. Port 1) issues a /C command to connect to a second port.

   i. To connect Port 1 to Port 2, type **/C 2 [Enter]**. While Port 1 is connected, the CMS will *not* recognize commands issued at Port 1. However, the unit *will* recognize a Resident Disconnect Sequence issued at Port 1 or Port 2.

   ii. Issue the Resident Disconnect Sequence (Logoff Sequence); type **[Enter]+++[Enter]**.

  b. **Third Party Connection:** Your resident port (e.g. Port 1) issues a /C command to create a connection between two other ports.

   i. To connect Port 2 to Port 3, type **/C 2 3 [Enter]**.

   ii. While Ports 2 and 3 are connected, Port 1 will still recognize CMS commands. Type **/S [Enter]** to display the Port Status Screen. The "STATUS" column should now list Ports 2 and 3 as connected, and Port 1 as "Free".

   iii. Issue a Third Party Disconnect command to disconnect Ports 2 and 3; type **/D 2 [Enter]**. The unit will display the "Are you Sure (y/n)?" prompt. Type **y** and press **[Enter]** to disconnect.

   iv. Type **/S [Enter]** to display the Port Status Screen. The "STATUS" column should now list Ports 2 and 3 as "Free".

7. **Site I.D. Message:** If desired, the Site I.D. Message can be used to indicate the name or location of the unit. Note that the Site I.D. cannot include double quotes (**"**).

  . Type **/F** and press **[Enter]**. When the System Parameters menu appears, type **1** and press **[Enter]**. A prompt will appear. Key in the desired text (up to 32 characters)

and press **[Enter]**.

b. To display the Site I.D., type **/ɔ [Enter]**.

c. Note that the Site I.D. will be cleared when the unit is initialized.

This completes the introductory overview of the CMS. Please proceed to <u>Section 4</u> and <u>Section 5</u> for complete installation and configuration procedures.

4. Hardware Installation

4.1. Connecting Power to the CMS Unit

The CMS is available in both AC and DC powered versions. When connecting AC or DC power to the CMS, proceed as follows:

CAUTION: This device should only be operated with the type of power source indicated on the instrument nameplate. If you are not sure of the type of power service available, please consult your local power company.

4.1.1. AC Powered Units

Plug the supplied power cable into the receptacle on the CMS back panel and then connect the power cable to a grounded AC outlet. The AC powered version of the CMS features a self adjusting power supply that automatically adapts to power supplies between 90 and 250 VAC.

4.1.2. DC Powered Units

The DC terminal block features two bus inputs as shown in <u>Figure 4.1</u> below. This allows the user to connect only one DC power source, or connect two DC power sources where the second source functions as a backup.

When connecting the CMS to your DC power source, first remove the clear protective cover from the DC terminal block, attach the wires from the -48V DC power source to the screw terminals, connect your ground line to the labeled ground screw, and then replace the protective cover.
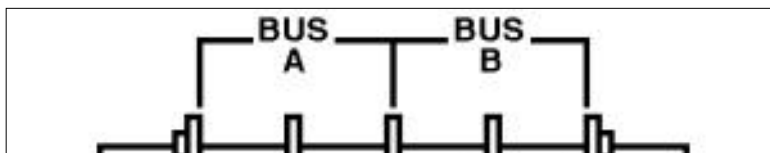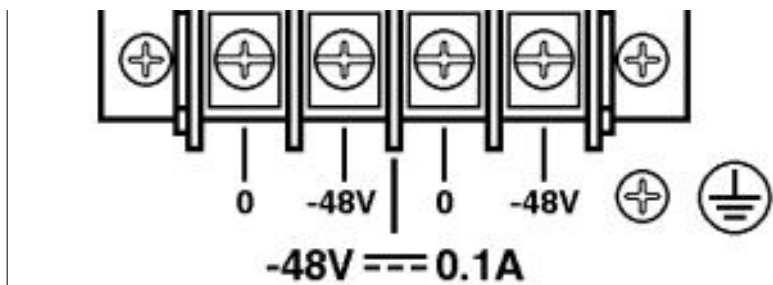
Figure 4.1: Terminal Block Assembly (DC Units Only)

4.2. Configure Option Switches

When the CMS is shipped from the factory, the Option Switches are configured for 9600 baud, 8 Bits-No Parity, RTS/CTS handshaking, verbose command response, and command echo ON (all switches Down). These settings are compatible with most applications. If the default settings are *not* compatible with your application, change the switch settings as follows.

The Option Switches should be configured to match the parameters your control device will use when communicating with the CMS. This will ensure access to command functions, even if the unit is initialized to default parameters.

Note:

- If the Option Switch configuration is changed, new parameters will not take effect until the unit is initialized as described in Section 4.3.
- Operating parameters (baud rate, parity, etc.) can be selected for each port using the /P command as described in Section 5.5. The /P command can select different parameters for each CMS port.
- When the CMS is initialized, parameters will return to settings specified by the Option Switches.

4.2.1. Default Baud Rate (Sw1, Sw2, Sw3)

Option Switches one through three select the *default* baud rate for all CMS RS232 Ports. The default baud rate must match the rate your control device will use when communicating with the CMS. If the control device will communicate via modem, select a default baud rate that is compatible with the modem.

SW			Default Baud Rate
1	2	3	
Down	Down	Down	9600*
Up	Down	Down	300
Down	Up	Down	1200
Up	Up	Down	2400
Down	Down	Up	19.2K

Up	Down	Up	38.4K
Down	Up	Up	57.6K
Up	Up	Up	115.2K

* = Factory Setting

4.2.2. Default Handshake (Sw4, Sw5)

The default handshake format must match the format your control device will use when communicating with the CMS. Option Switches 4 and 5 can select RTS/CTS (hardware), XON/XOFF, Both or None.

Switch		Default Handshake
4	5	
Down	Down	RTS/CTS *
Up	Down	XON/XOFF
Down	Up	Both
Up	Up	None

* = Factory Setting

4.2.3. Default Response Message Format (Sw6)

When commands are invoked, the CMS can respond with either verbose (English text) or terse (numeric / abbreviated) messages. Response messages are summarized in Section 10.2. After installation, the /P command can also set the response format to "none" (Quiet Mode). When Quiet Mode is selected, the unit will not send response messages.

Switch 6	Default Response Message Type
Down	Verbose (English Text) *
Up	Terse (abbreviated / numeric)

* = Factory Setting

4.2.4. Default Command Echo (Sw7)

Switch Seven enables or disables the Command Echo. When enabled, characters sent to the CMS will be echoed back to the control device.

Switch 7	Default Command Echo
Down	Enable*
Up	Disable

$* = $ Factory Setting

4.3. Initialize Unit to Default Settings

If Option Switch settings are changed, new parameters will not take effect until the CMS is initialized.

> **Caution: After initialization, the CMS will revert to the parameters specified by the Option Switches. Any command-selected parameters will be lost.**

1. Simultaneously press the SET and CLEAR buttons, located on the face of the CMS.

2. Release the CLEAR button, wait for the Port LEDs to flash, and then release the SET button.

4.4. Connecting Devices to the CMS

1. Access the Command Mode.

2. Determine which port will be used for connection to the new device (e.g. Port 3).

3. **Check Buffer:** Type `/S` **[Enter]** to display the Port Status Screen. Check the "Buffer Count" column, which lists the amount of data stored in the buffer for each port.

   . If the Port Status Screen shows data stored in the buffer for the desired port, type `/E xx` **[Enter]** to clear the buffer (where `xx` is the desired port number).

   b. Note that cleared data cannot be recovered.

4. Use an appropriate DB9 cable to connect the RS232 serial port on the device to a DB9 port on the CMS.

   . **External Modems and other DCE Devices:** Use a standard serial modem cable.

   b. **PCs and other DTE Devices:** Use a standard null modem cable.

5. Select communication parameters for each port as described in Section 5.

4.5. Application Example
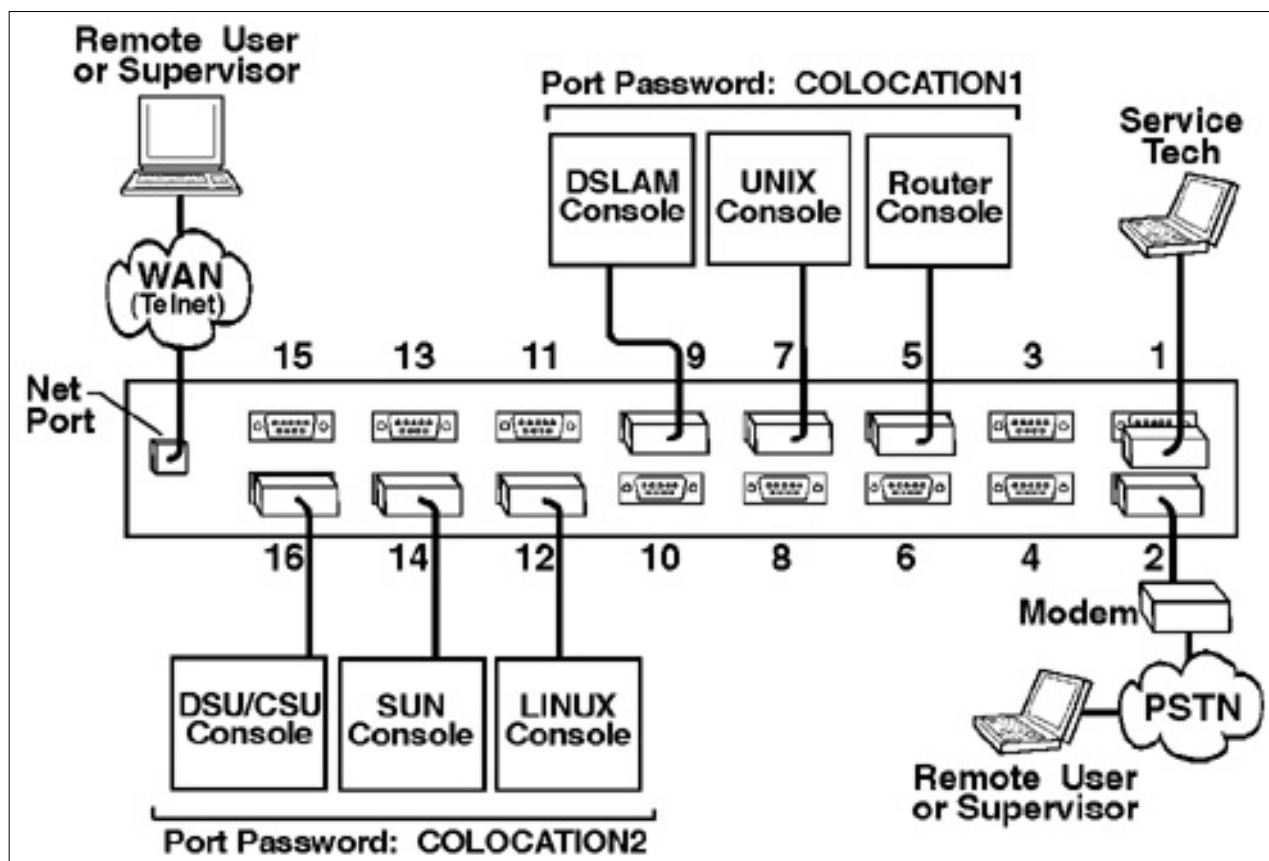
Figure 4.2: CMS Application Example (Not to Scale)

The example in Figure 4.2 shows one of many possible installation configurations for the CMS. In this example, ports have been configured as follows:

- **Network Port:** The Network Port allows telnet access by remote Supervisors and/or Users. When a telnet connection is established, the CMS will prompt the caller to enter a password. If the Supervisor Password is entered, the CMS will recognize Supervisor Level Commands; if a Port password is entered, the CMS will only recognize User Level Commands. Supervisors are allowed to adjust port configuration, connect to any port, or review unit status. Users are only permitted to review status and connect to ports that are allowed by their Port password.

- **Port 1 (System SetUp Port):** This port has been left open in order to permit on-site service personnel to access the Command Mode without disrupting other ports. Since Port 1 is a System SetUp Port, the service tech is allowed password protected access to Supervisor Level commands, and is able to connect to any port, change configuration, or display unit status.

- **Port 2 (Modem Port):** An external modem has been installed at Port 2. This port has also been configured for Modem Mode, which allows definition of a modem reset string, initialization string, and hang-up string. When a caller contacts the CMS unit via modem, a password prompt will be displayed. If the Supervisor Password is entered, the CMS will permit access to Supervisor Level Commands; if a Port password is entered, the CMS will only recognize User Level Commands. Supervisors are allowed to adjust port configuration, connect to any port, or review unit status. Users are only allowed to review status and connect to the ports allowed by their Port Password.

- **Ports 5, 7, and 9 (User Ports):** The Port Password "COLOCATION1" has been assigned to these three ports. If the CMS is contacted via the Network Port or Modem Port, and this password is entered at log in, Users will only be able to review status and connect to the devices attached to Ports 5, 7, and 9.

- **Ports 12, 14, and 16 (User Ports):** The Port Password "COLOCATION2" has been assigned to these three ports. If the CMS is contacted via the Network Port or Modem Port, and this password is entered at log in, Users will only be able to review status and connect to the devices attached to Ports 12, 14, and 16.

Note that in this example, Ports 3 through 16 could also be a mixture of ports connected to external modems, and ports connected to devices such as file servers or archives. This would allow remote users to dial in and access a specific file server or archive after entering a valid Port Password at log in.

5.   Configuration

5.1.   Access to the CMS Command Mode

When the CMS Command Mode is active, commands can be invoked to select parameters, and connect or disconnect ports.

> **Note:** Command Mode *cannot* be accessed from a Buffer Mode Port, Passive Mode Port, or any port that is currently connected to another CMS port.

1. Start your communications program (e.g. ProComm©). Make certain the CMS and ProComm are set for the same parameters (e.g. baud, parity, etc.).

2. Access the Command Mode.

    . **Local Access:** To access the command mode from a local PC that is connected to the CMS via cable, press **[Enter]**.

        i. If you have already hit other keys, press **[Enter]** twice. There can be no other characters preceding **[Enter]**.

        ii. If the Supervisor Password has been defined, the password prompt will be displayed. Key in your Supervisor or Port password and press **[Enter]**. The "CMS>" prompt will appear.

    b. **Modem Access:** To access the command mode via modem, proceed as follows:

        i. Dial the number for the external modem connected to the CMS.

ii. If you have defined the Supervisor Password, a prompt will be displayed. Key in your Supervisor or Port password and press **[Enter]**. If the Supervisor Password has *not* been defined, just press **[Enter]**. The "CMS>" prompt will appear.

c. **Network Access:** In order to access the CMS command mode via network, the IP Address, Subnet Mask and Gateway Address must first be defined. Therefore, network access is not available during initial configuration.

After Network Port Parameters are assigned as described in Section 5.5.3, the user may connect to the CMS via network using the following procedure:

i. Telnet to the CMS's IP Address. For example, if the IP Address is "192.1.1.1", on a UNIX system, the Telnet command would be invoked as follows:

```
$ telnet 192.1.1.1 [Enter]
```

ii. Note that if the Telnet connection to the CMS is refused, this probably means that the network port is busy, or that the IP Security feature has denied the connection.

iii. If the Supervisor Password has been defined, the password prompt will be displayed. Key in your Supervisor or Port password and press **[Enter]**. The CMS will display the Port Status Screen, and then the "CMS>" prompt will appear.

5.2. System SetUp Ports

As discussed previously in Section 3 of this User's Guide, Ports 1 and 2 are designated as System SetUp Ports. Ports 1 and 2 will always permit password protected access to Supervisor Level command functions, even when the unit is reset to default parameters.

In order to ensure that access to command functions is always available, Ports 1 and 2 *cannot* be configured as Buffer Mode or Passive Mode Ports. Buffer and Passive Mode Ports are not able to access the Command Mode. In addition, Ports 1 and 2 always permit password protected access to Supervisor Level commands; the Supervisor Mode *cannot* be disabled at these two ports.

5.3. Password Functions

The CMS features two different types of passwords; the Supervisor Password and the Port

(User) Passwords. The Supervisor Password allows system administrators to invoke unit configuration commands, and the Port Passwords allow users to access specific ports in order to create connections between ports or view port configuration parameters.

5.3.1. The Supervisor Password

The Supervisor Password allows access to higher level CMS configuration commands, which administrators can employ to select communication parameters, set up IP Security, assign port access rights, and perform other system management tasks.

When the Supervisor Password is defined (via the System Parameters menu), the CMS will display a password prompt whenever you attempt to access the command mode. If the correct Supervisor Password is entered, the CMS command mode then starts up in Supervisor Mode. Supervisor Level commands are summarized in Section 10.3 of this User's Guide.

Note:

- If the Supervisor Password is *not* defined, then Supervisor Level commands will be available to all ports, and port access and configuration functions will not be password protected.
- If you wish to restrict user ports from changing CMS configuration parameters or connecting to restricted ports, the Supervisor Password must be defined.
- When the Supervisor Password is defined, the CMS will display a password prompt when you attempt to access the command mode. Any RS232 port that has *not* been assigned a Port Password, can then only be accessed using the Supervisor Password.

Normally, the Supervisor Password can be entered at any port in order to gain access to Supervisor Level commands. Note that if you wish to completely deny a port's access to Supervisor Mode (even *with* the Supervisor Password), the Port Parameters menus (/P and /N) can be used to disable the Supervisor Mode at ports 3 through 16 and the Network Port. The Supervisor Mode *cannot* be disabled at System SetUp Ports 1 and 2.

Note that if the unit is reset to default parameters, all ports will revert to the default state, where Supervisor Level commands are available to all ports, without password protection.

Note:

- When defining a Supervisor Password, it is strongly recommended that you record the password for future use.
- If you forget or lose your Supervisor Password, you will not be able to access Supervisor Level Commands. In this case, the only way to access the Supervisor Mode, is to reinitialize the CMS to default values as described in Section 4.2.

5.3.2. The Port Passwords

The Port Passwords (or User Passwords) allow system administrators to restrict access to a specific group of ports. When the CMS command mode is accessed with a Port Password, users may only connect to the RS232 Ports to which they have been granted access, and review configuration parameters for those ports. Port Passwords do *not* grant access to CMS configuration commands.

The configuration menus (/P) for each RS232 port allow a Port Password to be assigned to each individual port. In order to allow a Port Password to grant access to a *series* of CMS ports, the same Port Password is assigned to each port in the series.

For example, if the Port Password "test" is assigned to ports 3, 4, and 5, then when "test" is entered at the Password Prompt, the user will only be able to connect to ports 3, 4, and 5, and will only be able to view parameters for ports 3, 4, and 5.

If desired, all CMS ports can function as both a Supervisor Port and a User Port, depending on which password is entered at the login prompt. However, if you wish to prevent a port from being able to access the Supervisor Mode at all (even *with* the Supervisor Password), the Supervisor Mode can be disabled at the RS232 Ports and the Network Port using the Port Configuration menus as described in Section 5.5. Note however, that the Supervisor Mode *cannot* be disabled at Ports 1 and 2; these ports are designated as SetUp Ports, and are always allowed password protected access to Supervisor Level commands.

5.4. Defining the Site ID and Supervisor Password

Before configuring individual ports, the Site ID and Supervisor Password should be defined. The Site ID can be used to indicate the location or name of the CMS unit, and the Supervisor Password is used to restrict access to sensitive command functions. Both the Site ID message and Supervisor Password are defined via the System Parameters menu (/F).

Note:

- The Site ID cannot include double quotes.
- The Supervisor Password cannot include an asterisk, forward slash, spaces, or double quotes.
- Both the Site ID and Supervisor Password will be cleared if the CMS is initialized to default settings.
- The System Parameters Menu is only available in Supervisor Mode.

1. Access the Command Mode. When the "CMS>" prompt appears, type **/F [Enter]** to display the System Parameters Menu.

2. **Site ID Message:** (Up to 32 characters; Default = undefined) Type **1** and press **[Enter]**, the Site I.D. Prompt will appear. Key in the desired text and press **[Enter]** . To display the Site I.D., type **/J [Enter]**. The Site ID is also listed on the Port Status and Port Diagnostic Screens.

3. **Supervisor Password:** (Up to 32 characters; Default = undefined) Type **2** and press

[Enter], a prompt will appear. Key in the desired password then press **[Enter]**, the CMS will prompt you to re-key the password in order to confirm spelling and capitalization. Key in the password a second time, and then press **[Enter]**.

Note:

- The Supervisor Password is case sensitive. Make certain to note the exact password entered, including the case of each letter.
- Make certain to write down your Supervisor Password. If the password is lost or forgotten, you will not be able to access Supervisor Level commands unless you initialize the unit and clear all parameters as described in Section 4.3.

5.5. Port Configuration

5.5.1. Configuration Conventions

When responding to prompts, invoking commands, and selecting items from the port configuration menus, note the following:

- To select an item from a Port Configuration menu, key in the number for the item and press **[Enter]**.

- To clear an item in a Port Configuration menu, enter the number for the desired item and press **[Enter]**. When the prompt appears, press **[Space]** and then press **[Enter]**.

- When defining the Port Name, do not use the forward slash character (**/**), double quotes (**"**), the asterisk character (*****), or blank spaces.

- Port Names *cannot* begin with a number.

- A Port cannot be named "**N**", this name is reserved for the Network Port.

- Refer to the instructions in each screen for additional functions available under that screen.

- To exit a menu or prompt without changing its current value, press **[Esc]**.

- Passwords and port names are case sensitive. When defining passwords and port names, note the exact text, including the case of each character.

- The "Who" command (/W) can be used to display currently selected parameters for your resident port. Note that when the Network port has been accessed using a Port Password (User Mode), the /W command will only display the selected Logoff Character.

5.5.2. Port Modes

The CMS offers four different port operation modes; Any-to-Any Mode, Passive Mode, Buffer Mode, and Modem Mode. The Port Modes function as follows:

- **Any-to-Any Mode:** Allows communication between connected ports. Any-to-Any Mode Ports can be connected to other Any-to-Any Mode, Passive Mode, Buffer Mode, or Modem Mode Ports by accessing Command Mode and invoking the /C command (see Section 7.1.1). The Any-to-Any Mode is available to all ports.

- **Passive Mode:** Allows communication between connected ports, but does *not* allow access to Command Mode. Passive Mode Ports can be connected by accessing Command Mode from a free Any-to-Any or Modem Mode port and invoking the /C command (see Section 7.1.1). The Passive Mode is not available to Ports 1 or 2 or the Network Port.

- **Buffer Mode:** Allows collection and storage of data received from connected devices. Collected data can be retrieved by accessing Command Mode from a free Any-to-Any or Modem Mode Port, and issuing the Connect (/C) Command. Note that the Buffer Mode also allows pass-through communication with the connected device. The Buffer Mode is not available to Ports 1 or 2 or the Network Port.

- **Modem Mode:** Allows communication between connected ports and simplifies connection to an external modem. A port configured for the Modem Mode can perform all functions normally available in Any-to-Any Mode. The Modem Mode also allows definition of a Hang-Up String, Reset String, and Initialization String. Any CMS RS232 port can be configured for the Modem Mode. The Modem Mode is not available at the Network Port.

For more information on Port Modes, please refer to Section 7.

5.5.3. RS232 Port Configuration Menus

The Port Configuration Menus are used to select options for each of the CMS RS232 ports. Parameters selected via these menus will stay in effect until the unit is initialized or the /P command is used to reconfigure the port. After initialization, parameters will revert to the defaults specified by the Option Switches.

To select port parameters, proceed as follows:

1. Access the Command Mode. If the password prompt is displayed, key in your Supervisor Level Password.

2. Type **/P**, followed by the number of the port to be configured, and press **[Enter]**. For example, to configure Port 2, type **/P 2 [Enter]**. The Port Configuration menu will appear (Figure 5.1).

. If the /P Command is entered without the port number (e.g. **/P [Enter]**), the configuration menu for your resident port will be displayed.

b. The /P command is only available in the Supervisor Mode

```
PORT PARAMETERS #02

 1.    Port Name:              (undefined)
 2.    Password:               (undefined)
 3.    Baud Rate:              9600
 4.    Bits/Parity:            8-None
 5.    Stop Bits:              1
 6.    Handshake Mode:         CTS/RTS
 7.    Port Mode:              Any-to-Any
       74.  DTR Output:        Pulse
 8.    Supervisor Mode:        Permit
 9.    Logoff Character:       +
10.    Sequence Disconnect:    Three Characters
11.    Timeout Disconnect:     Off
12.    Response Type:          Verbose
13.    Command Echo:           On
14.    Accept Break:           Yes



Enter:  "<" Previous Port,
        ">" Next Port,
        <ESC> Exit ...
```

Figure 5.1:   Port Configuration Menu (Port 2 Shown)

The Port Configuration menu offers the following options:

- **1. Port Name:** (Up to 16 characters) Assigns a name to the port. (Default = undefined).

- **2. Password:** (Up to 16 characters) Defines the Port Password for this port. Note that identical Port Passwords are generally assigned to several ports. When this password is entered at the login prompt, the user will then have access to all ports that share this password. (Default = undefined).

  Note: The Port Password is *not* displayed by the Port Parameters menu. When the Port Password has been defined, the field for this item will read "defined". To display Port Passwords, invoke the /SP or /WP commands as described in <u>Section 6</u>.

- **3. Baud Rate:** Selects the baud rate for the port. Can be set to any standard rate from 300 bps to 115.2K bps. (Default = Selected By Option Switches 1, 2, and 3)

- **4. Bits/Parity:** (Default = 8-None).

- **5. Stop Bits:** (Default = 1).

- **6. Handshake Mode:** Selects the handshake format for this port; XON/XOFF, RTS/CTS (hardware), Both, or None. (Default = RTS/CTS).

- **7. Port Mode:** Defines the operation mode for this port. Note that Ports 1 and 2 *cannot* be configured for Passive Mode or Buffer Mode. (Default = Any-to-Any Mode).

  When Any-to-Any, Passive, or Buffer Mode is selected, the unit will display the DTR Output prompt as shown in Figure 5.1. The DTR Output prompt is not displayed when Modem Mode is selected.

  - ❍ **74. DTR Output:** Determines how the DTR line will react when this port disconnects. The DTR line can be held low, held high, or pulsed for 0.5 seconds and then held high. In the default state, the DTR line will pulse for 0.5 seconds and then remain high. For more information on DCD and DTR hardware lines, please refer to Appendix A. (Default = Pulse).

```
PORT PARAMETERS #02

 1.   Port Name:            (undefined)
 2.   Password:             (undefined)
 3.   Baud Rate:            9600
 4.   Bits/Parity:          8-None
 5.   Stop Bits:            1
 6.   Handshake Mode:       CTS/RTS
 7.   Port Mode:            Modem
      71.  Reset String:    ATZ
      72.  Init String:     AT&C1&D2S0=1
      73.  Hang-Up String:  (undefined)
 8.   Supervisor Mode:      Permit
 9.   Logoff Character:     +
10.   Sequence Disconnect:  Three Characters
11.   Timeout Disconnect:   Off
12.   Response Type:        Verbose
13.   Command Echo:         On
14.   Accept Break:         Yes



Enter:  "<" Previous Port,
        ">" Next Port,
        <ESC> Exit ...
```

Figure 5.2: Port Configuration Menu (Modem Mode)

When Port Mode (menu Item 7) is set to Modem Mode, the menu will include additional prompts (see Figure 5.2), which are used to define the following:

  - ❍ **71. Reset String:** If necessary, this prompt can be used to re-define the modem reset string. The Reset String is sent prior to the Initialization string in order to select common initial parameters. (Default = **ATZ**).

  - ❍ **72. Initialization String:** Defines a command string that is sent after the Reset String to initialize a modem to settings required by your application. (Default = **AT&C1$D2S0=1**).

❍ **73. Hang-Up String:** Defines the modem hang-up message. Although the CMS will pulse the DTR line in order to hang-up an attached modem, the Hang-Up string is often useful for controlling modems that do not use the DTR line. (Default = undefined).

● **8. Supervisor Mode:** Permits or denies port access to Supervisor Mode. When this item is enabled (Permit), and the valid Supervisor Password is entered, the port will be allowed to invoke Supervisor Level commands. If this item is disabled (Deny), the port may *not* enter Supervisor Mode, even when the Supervisor Password is entered. (Default = Permit).

● **9. Logoff Character:** Defines the Logoff Character for this port. The Logoff Character determines the command sequence that must be issued at this port in order to disconnect from a second port (Resident Disconnect). Note the following:

❍ The default Logoff Character is "**+**". As a result, the default Resident Disconnect Sequence is **[Enter]+++[Enter]**.

❍ The default three character Resident Disconnect Sequence uses the format "**[Enter]LLL[Enter]**", where **L** is the Logoff Character. If the one character disconnect is selected (see item 10), a resident connection is terminated by simply typing the Logoff Character once (without carriage returns).

● **10. Sequence Disconnect:** Enables/Disables and configures the Resident Disconnect command. This prompt offers the option to either disable the Sequence Disconnect, select a three character format, or select a one character format. (Default = Three Characters). Note the following:

❍ When a Resident Connection is initiated, the CMS will send a message which lists the connected ports, and displays the one character or three character disconnect command that will be required in order to terminate the connection.

❍ The One Character Disconnect sequence is intended for situations where the destination port should *not* receive the disconnect command. When the Three Character format is selected, the disconnect sequence *will* pass through to the destination port prior to breaking the connection.

❍ When the Three Character format is selected, the Resident Disconnect Sequence will use the format "**[Enter]LLL[Enter]**", where **L** is the selected Logoff Character.

❍ When the One Character format is selected, resident connections are terminated by entering the selected Logoff Character only. There is no need to press **[Enter]** before and after the Logoff Character when the One Character format is selected.

- **11. Timeout Disconnect:** Enables and selects the Timeout Period for this port. If enabled, and the port does not receive or transmit data for the specified Timeout Period, the port will disconnect. When the port is set for Any-to-Any Mode, Passive Mode, or Buffer Mode, the default setting for this item is "OFF". When the port is set for Modem Mode, the default setting for this item is 15 minutes.

- **12. Response Type:** Selects the type of messages that this port will send in response to commands. The user can select Verbose (English Text), Terse (Numeric / Abbreviation), or Quiet Mode (No Response). (Default = Verbose).

- **13. Command Echo:** Enables or Disables the command echo for this port. (Default = On).

- **14. Accept Break:** Determines whether the port will accept breaks received from the attached device, and pass them along to a connected port. When enabled, breaks received at this port will be passed to any port that this port is connected to, and sent along to the device connected to the other port. When disabled, breaks will be refused at this port, and hence, not sent to the other port. (Default = Yes)

5.5.4. Network Port Configuration Menu

In order to communicate with the CMS via network, the IP Address, Subnet Mask, and Gateway Address must first be defined using the Network Parameters Menu. If desired, the Network Parameters menu also allows you to implement IP Security features, which can restrict command mode access based on the user's IP Address.

Settings for network parameters depend on the configuration of your individual network. Please contact your network administrator for appropriate settings, and then assign parameters as described in this section.

```
NETWORK PARAMETERS
  1.   IP Address:            (undefined)
  2.   Subnet Mask:           (undefined)
  3.   Gateway Address:       (undefined)
  4.   IP Security:           Off

TELNET PORT PARAMETERS
11.   Port Name:             (undefined)
12.   Supervisor Mode:       Permit
13.   Logoff Character:      +
14.   Sequence Disconnect:   Three Characters
15.   Timeout Disconnect:    5 Min
16.   Response Type:         Verbose
17.   Command Echo:          On
18. Accept Break:            Yes

Enter: #<CR> to Change,
       <ESC> Exit ...
```

Figure 5.3: Network Parameters Menu (Supervisor Mode Only)

To access the Network Parameters menu, type **/N** and press **[Enter]**. The screen shown in Figure 5.3 will be displayed. Note that the Network Parameters menu is only available in Supervisor Mode. The Network Parameters menu offers the following options:

1. **IP Address:** Defines the IP Address for the CMS unit. Type **1** press **[Enter]**, and follow the instructions in the submenu. (Default = undefined).

2. **Subnet Mask:** Defines the Subnet Mask for the CMS unit. Type **2** press **[Enter]**, and follow the instructions in the submenu. (Default = undefined).

3. **Gateway Address:** Defines the Gateway Address for the CMS unit. Type **3** press **[Enter]**, and follow the instructions in the submenu. (Default = undefined).

4. **IP Security:** Sets up the IP Security feature as described in Section 5.5.5.

11. **Port Name:** (Up to 16 characters) Assigns a name to the Network Port. (Default = undefined).

12. **Supervisor Mode:** Permits or denies access to the Supervisor Mode. When enabled (Permit), and the valid Supervisor Password is entered, this port may then issue Supervisor level commands. If disabled (Deny), the port may *not* enter Supervisor Mode, even when the Supervisor Password is entered. (Default = Permit).

13. **Logoff Character:** Defines the Logoff Character for the Network Port. The Logoff Character determines the disconnect sequence that is issued at this port in order to disconnect from a second port (Resident Disconnect). When defining the Logofff Character, note the following:

    - The default Logoff Character is "**+**". As a result, the default Resident Disconnect Sequence is **[Enter]+++[Enter]**.

    - The default three character Resident Disconnect Sequence uses the format **[Enter]LLL[Enter]**, where **L** is the Logoff Character. If the one character disconnect is selected (see item 14), a resident connection is terminated by simply typing the Logoff Character once (without carriage returns)

14. **Sequence Disconnect:** Enables/Disables and configures the Resident Disconnect command. This prompt offers the option to either disable the Sequence Disconnect, select a three character format, or a one character format. (Default = Three Characters). Note the following:

    - When a Resident Connection is initiated, the CMS will send a message which lists connected ports, and displays the one character or three character disconnect

command that will be required in order to terminate the connection.

- The One Character Disconnect is intended for situations where the destination port should *not* receive the disconnect command. When the Three Character format is selected, the disconnect sequence *will* pass through to the destination port prior to breaking the connection.

- When Three Character format is selected, the Resident Disconnect uses the format "**[Enter]`LLL`[Enter]**", where `L` is the selected Logoff Character.

- When the One Character format is selected, resident connections are terminated by entering the selected Logoff Character only. There is no need to press **[Enter]** before and after the Logoff Character when the One Character format is selected.

15. **Timeout Disconnect:** Enables and selects the Timeout Disconnect for the Network Port. If enabled, and the port does not receive or transmit data for the specified time period, the port will disconnect. (Default = 5 Minutes).

16. **Response Type:** Selects the type of messages that the port will send in response to commands. The user can select Verbose (English Text), Terse (Numeric / Abbreviation), or Quiet Mode (No Response). (Default = Verbose).

17. **Command Echo:** Enables or Disables the command echo for the Network Port. (Default = On).

18. **Accept Break:** Determines whether the port will accept breaks received from the attached device, and pass them along to a connected port. When enabled, breaks received at this port will be passed to any port that this port is connected to, and sent along to the device connected to the other port. When disabled, breaks will be refused at this port. (Default = Yes).

5.5.5. Implementing IP Security

The CMS can be configured to restrict unauthorized IP addresses from Telneting to the unit. This allows the user to grant Telnet access to only a specific group of IP addresses, or block a particular IP address from gaining access. In the default state, the CMS accepts incoming IP connections from all hosts. To configure the IP Security feature, proceed as follows:

Note: In the default state, the CMS will allow all IP addresses to Telnet to the unit.

1. Access the Network Parameters menu as described in Section 5.5.4. Note that the Network Parameters menu is only available in Supervisor Mode.

2. When the Network Parameters menu appears, type **4** and press **[Enter]** to access the IP

Security menu (Figure 5.4).

```
IP SECURITY:

 1.    Security Mask #1:    (undefined)
 2.    Mask #1 Action:      Permit
 3.    Security Mask #2:    (undefined)
 4.    Mask #2 Action:      Permit
 5.    Security Mask #3:    (undefined)
 6.    Mask #3 Action:      Permit
 7.    Security Mask #4:    (undefined)
 8.    Mask #4 Action:      Permit
 9.    Security Mask #5:    (undefined)
10.    Mask #5 Action:      Permit



Enter:   #<CR> to Select Menu,
         <ESC> for Previous Menu ...
```

Figure 5.4: IP Security Menu

3. The IP Security Menu lists five IP Security "masks" along with the selected permit/deny action for each mask.

   . Each Security Mask prompt is used to define a specific IP address or range of IP addresses. Each Mask Action prompt is used to select the permit/deny action for the corresponding mask.

   b. Masks are listed in order of ascending priority; Mask 1 has the lowest priority, and Mask 5 has the highest priority.

   c. Masks have a cumulative effect; high priority masks supersede the effect of lower priority masks.

   d. Each IP Address consists of a series of four eight bit numbers. The number 255 is used as a wild card.

Example 1: Deny access to all hosts except 192.1.1.5:

- Security Mask #1:   255.255.255.255
- Mask #1 Action: Deny
- Security Mask #2:   192.1.1.5
- Mask #2 Action: Permit

Since 255 is a wild card, Mask #1 blocks all IP Addresses. Mask #2 then specifically grants access to 192.1.1.5 only.

Example 2: Allow access only by addresses that begin with 192:

- Security Mask #1:   255.255.255.255

- Mask #1 Action: Deny
- Security Mask #2:   192.255.255.255
- Mask #2 Action: Permit

Since 255 is a wild card, Mask #1 blocks all IP addresses Mask #2 then grants access to all addresses that begin with 192.

Example 3: Allow access only by addresses that begin with 192, deny access to 192.1.1.5.

- Security Mask #1:   255.255.255.255
- Mask #1 Action: Deny
- Security Mask #2:   192.255.255.255
- Mask #2 Action: Permit
- Security Mask #3:   192.1.1.5
- Mask #3 Action: Deny

Since 255 is a wild card, Mask #1 blocks all IP addresses. Mask #2 then grants access to all addresses that begin with 192. Finally, Mask #3 specifically blocks access by 192.1.1.5.

Note:

- Mask #5 has priority over the four other masks. If Mask #5 is set to deny access by "255.255.255.255" (all wild cards), all IP addresses will be blocked, and you will not be able to access the CMS Command Mode via network. Access will only be allowed via the Console Port or Modem Port.
- When using the wild card address "255.255.255.255" to block access by all IP addresses, make certain that at least one higher priority mask permits access by *your* IP address.

5.6.   Copying Parameters to All Ports

The /CP command (Copy Port Parameters) provides a convenient means for selecting identical (or similar) parameters for all CMS RS-232 ports.

When the /CP command is invoked, the unit will display a menu which allows you to select port communication parameters, and then copy them to all CMS RS-232 ports. The Copy Port Parameters menu can be used to set *all* parameters for *all* RS-232 Ports, or define only a select group of parameters and then copy them to all ports.

Note:

- The /CP command will *not* copy parameters to the Network Port.
- The /CP command is only available in Supervisor Mode.
- The Copy Port Parameters Menu will not display the Port Password. This field will read either "undefined" or "defined", depending upon whether or not the Port Password has been specified.

To select common parameters for all CMS RS-232 ports, proceed as follows:

1. Access the CMS command mode. If the password prompt is displayed, key in your Supervisor Level Password.

2. At the command prompt, type **/CP** and press **[Enter],** the menu shown in Figure 5.5 will be displayed.

```
COPY PORT PARAMETERS:

 1. Port Name:
 2. Password:              (undefined)
 3. Baud Rate:
 4. Bits/Parity:
 5. Stop Bits:
 6. Handshake Mode:
 7. Port Mode:
    74. DTR Output:
 8. Supervisor Mode:
 9. Logoff Character:
10. Sequence Disconnect:
11. Timeout Disconnect:
12. Response Type:
13. Command Echo:
14. Accept Break:

(Note: Ports 1 & 2 will NOT have restricted values changed.)
Enter: Parameter # <CR> to define parameter value to copy to all
ports,
       -<CR> to remove all values set,
       X<CR> to exit WITHOUT copy,
       <ESC> to copy to all ports and exit ...
```

Figure 5.5:   The Copy Port Parameters Menu

3. **Selecting Parameters:** To select parameters to be copied, key in the number for the desired parameter, press **[Enter]**, and then follow the instructions in the submenu. Note that it is not necessary to define *all* port parameters, for example, the /CP command could be used to select only the Baud Rate for all ports.

   Note: The /CP command will only copy the parameters that are currently displayed by the Copy Port Parameters menu. Note that although the Port Password is not displayed, the selected password will be copied if the field for this item reads "defined".

4. **Clear Menu:** After defining several parameters, if you wish to clear the /CP menu and start again, type **‒** (dash) and press **[Enter]**, the menu will be reset.

5. **Copy Parameters:** When you have finished selecting parameters, press **[Esc]** to copy the selected parameters to all CMS RS-232 Ports and exit from the Copy Port Parameters menu.

5.7.   Save User Selected Parameters

Although this step is optional, it is strongly recommended to save all user- defined parameters to an ASCII file. This will allow quick recovery in the event of accidental deletion or reconfiguration of port parameters. Section 8 describes the procedure for saving configuration parameters to an ASCII file.

6.   The Status Screens

The CMS Status Screens display the connection status and communication parameters for the sixteen RS-232 ports and the Network Port. There are four different types of status screens; The Port Status Screen (/S), the Port Diagnostics Screen (/SD), the Network Status Screen (/SN), and the Port Parameters Screens (/W).

6.1.   The Port Status Screen (/S)

The Port Status Screen lists the general status of the CMS's RS-232 ports. To display the Port Status Screen, access the command mode and type **/S [Enter]**, the screen will appear as shown in Figure 6.1.

Although both Supervisors and Users can display the Port Status Screen, the screen will appear slightly different, depending upon whether the command mode was accessed with the Supervisor Password or a Port Password. When a Port Password (User Mode) is entered at login, the Port Status Screen will only display the status of those ports that share the same Port Password that was entered at login.

When the Supervisor Mode is active, the Port Status Screen offers the option to either display or suppress Port Passwords. Normally, when the /S command is invoked, the Password column will read either "defined" or "undefined", depending upon whether or not the password for each port has been specified. To display the Port Status Screen *with* Port Passwords included, type **/SP** and then press **[Enter]**. Note that the /SP command option is not available in User Mode.

```
PORT STATUS:    Version 1.02,  Site ID: (undefined)

PORT |        NAME        |      PASSWORD      | STATUS | MODE | BUFFER COUNT
-----+--------------------+--------------------+--------+------+--------------
 01  | (undefined)        | (undefined)        |  Free  | Any  |             0
 02  | (undefined)        | (undefined)        |  Free  | Any  |             0
 03  | (undefined)        | (undefined)        |  Free  | Any  |             0
 04  | (undefined)        | (undefined)        |  Free  | Any  |             0
 05  | (undefined)        | (undefined)        |  Free  | Any  |             0
 06  | (undefined)        | (undefined)        |  Free  | Any  |             0
 07  | (undefined)        | (undefined)        |  Free  | Any  |             0
 08  | (undefined)        | (undefined)        |  Free  | Any  |             0
     |                    |                    |        |      |
 09  | (undefined)        | (undefined)        |  Free  | Any  |             0
 10  | (undefined)        | (undefined)        |  Free  | Any  |             0
 11  | (undefined)        | (undefined)        |  Free  | Any  |             0
```

```
 12  | (undefined)         | (undefined)         | Free | Any |                0
 13  | (undefined)         | (undefined)         | Free | Any |                0
 14  | (undefined)         | (undefined)         | Free | Any |                0
 15  | (undefined)         | (undefined)         | Free | Any |                0
 16  | (undefined)         | (undefined)         | Free | Any |                0

Enter /H for Command Menu
```

Figure 6.1:   The Port Status Screen (Supervisor Mode, Defaults Shown)

As shown in Figure 6.1, The Port Status Screen lists the following items:

- **Name:** The user-defined name for each port.

- **Password:** The user-defined password for each port. Note that actual passwords are not displayed; this column will read either "undefined" or "defined". To display Port Passwords, type **/SP [Enter]** (Supervisor Mode Only).

- **Status:** The connect status of each port. When the port is connected, this column will list the number of the other CMS port connected to this port. An "N" indicates that this port is currently connected to the CMS Network Port.

- **Mode:** The user-selected Port Mode. This column will read Any (Any-to-Any), Modem, Passive, or Buffer, depending on the configuration selected for the port.

- **Buffer Count:** Lists the amount of data (in bytes) stored in the buffer for this port.

6.2.   The Port Diagnostics Screen (/SD)

The Port Diagnostics Screen provides more detailed information about each port, including the port name and communication parameters. To display the Port Diagnostics Screen, access the command mode and type **/SD [Enter]**, the screen will appear as shown in Figure 6.2.

Like the Port Status Screen, the Port Diagnostics Screen is also available to both Supervisors and Users, and will appear slightly differently, depending upon whether the command mode was accessed with the Supervisor Password or a Port Password (User Mode).

In User Mode, the Port Diagnostics Screen will display only the status of those ports that share the same Port Password that was entered at login. Ports that are protected by other passwords will not be displayed.

```
PORT DIAGNOSTICS:   Version 1.02    Site ID: (undefined)

PORT |       NAME        | STATUS | BAUD | COM | HS  | MODE | BUF | CTS
-----+-------------------+--------+------+-----+-----+------+-----+-----
 01+ | (undefined)       | *Free  | 9600 | 8N1 | RTS | Any  |   0 |  H
 02+ | (undefined)       | *Free  | 9600 | 8N1 | RTS | Any  |   0 |  L
 03+ | (undefined)       | *Free  | 9600 | 8N1 | RTS | Any  |   0 |  L
 04+ | (undefined)       | *Free  | 9600 | 8N1 | RTS | Any  |   0 |  L
 05+ | (undefined)       | *Free  | 9600 | 8N1 | RTS | Any  |   0 |  L
 06+ | (undefined)       | *Free  | 9600 | 8N1 | RTS | Any  |   0 |  L
 07+ | (undefined)       | *Free  | 9600 | 8N1 | RTS | Any  |   0 |  L
 08+ | (undefined)       | *Free  | 9600 | 8N1 | RTS | Any  |   0 |  L
     |                   |        |      |     |     |      |     |
 09+ | (undefined)       | *Free  | 9600 | 8N1 | RTS | Any  |   0 |  L
 10+ | (undefined)       | *Free  | 9600 | 8N1 | RTS | Any  |   0 |  L
 11+ | (undefined)       | *Free  | 9600 | 8N1 | RTS | Any  |   0 |  L
 12+ | (undefined)       | *Free  | 9600 | 8N1 | RTS | Any  |   0 |  L
 13+ | (undefined)       | *Free  | 9600 | 8N1 | RTS | Any  |   0 |  L
 14+ | (undefined)       | *Free  | 9600 | 8N1 | RTS | Any  |   0 |  L
 15+ | (undefined)       | *Free  | 9600 | 8N1 | RTS | Any  |   0 |  L
 16+ | (undefined)       | *Free  | 9600 | 8N1 | RTS | Any  |   0 |  L

Enter /H for Command Menu
```

Figure 6.2:   The Port Diagnostics Screen (Defaults Shown)

As shown in Figure 6.2, the Port Diagnostics Screen lists the following items:

- **Port:** The Port Number. Note that if this column contains a plus sign (**+**), this indicates that the port will be allowed to access the Supervisor Mode if the appropriate Supervisor Password is entered at login.

- **Name:** The user-defined name for each port.

- **Status:** The connect status for each port. When the port is connected, this column will list the number of the other port that is connected to this port. Note that if this column contains an asterisk, this indicates that the port has accessed the Command Mode.

- **Baud:** The baud rate selected for each port.

- **COM:** The Data Bits, Parity, and Stop Bits selected for each port. For example, "8N1" indicates Eight data bits, No parity, and One stop bit.

- **HS:** The handshaking (flow control) mode for each port.

- **Mode:** The user-selected Port Mode. This column will read Any (Any-to-Any), Modem, Passive, or Buffer, depending on the configuration selected for each port.

- **BUF:** Lists the amount of data (in bytes) currently stored in the buffer for this port.

● **CTS:** The High/Low status of the CTS line at the RS232 interface.

6.3. The Network Status Screen (/SN)

This screen lists general parameters for the Network Port. To display the Network Status Screen (Figure 6.3), type **/SN** and press **[Enter]**.

Note that the Network Status Screen is only available in Supervisor Mode. When the user has logged on with a Port Password, the /SN command will return an "invalid" message.

```
NETWORK STATUS


LAN STATUS
NIC Installed:      Yes
MAC Address:        00-40-05-6d-a3-ed

TELNET PORT STATUS
Name:               (undefined)
Telnet Connection:  No
Port Connection:    Free
Buffer Count:       0

CMS>
```

Figure 6.3:   The Network Status Screen (Defaults Shown)

As shown in Figure 6.3, the Network Status Screen lists the following information:

● **NIC Installed:** If your CMS unit includes a Network Card, this item will read "Yes".

● **MAC Address:** The permanent physical address assigned to the Network Card

● **Name:** The user-defined name for the Network Port.

● **Telnet Connection:** This item will read "Yes" when a remote user is connected to the Network Port via telnet.

● **Port Connection:** The connect status of the Network Port. When the Network Port is connected to an RS232 port, this item will list the number of the RS232 port. If the Network port is *not* connected to another port, this item will read "Free".

● **Buffer Count:** Lists the amount of data (in bytes) stored in the buffer for this port.

6.4. The Port Parameters Screens (/W)

The /W command displays more detailed information about an individual CMS port. Rather than listing connection information for all ports like the Port Status Screens, the Port Parameters screen lists all defined parameters for a specific port.

```
PORT PARAMETERS #03:

 1. Port Name:            (undefined)
 2. Password:             (undefined)
 3. Baud Rate:            9600
 4. Bits/Parity:          8-None
 5. Stop Bits:            1
 6. Handshake Mode:       RTS/CTS
 7. Port Mode:            Any-to-Any
    74. DTR Output:       Pulse
 8. Supervisor Mode:      Permit
 9. Logoff Character:     +
10. Sequence Disconnect:  Three Characters
11. Timeout Disconnect:   Off
12. Response Type:        Verbose
13. Command Echo:         On
14. Accept Break:         Yes

Enter: "<" previous port,
       ">" next port,
       <ESC> exit ...
```

Figure 6.4: The Port Parameters Screen (RS232 Port Shown)

The /W command is available in both Supervisor Mode and User Mode. Note however, that when you log in with a Port (User) password, the CMS will only display information regarding your resident port.

When the Supervisor Mode is active, the Port Parameters Screens offer the option to either display or suppress the Port Passwords. Normally, when the /W command is invoked, the Password field will read either "defined" or "undefined", depending upon whether or not the password for that port has been specified. To display the Port Parameters Screen *with* the Port Password, type **/WP**, followed by the desired port number, and then press **[Enter]**. Note that the /WP command option is not available in User Mode.

The /W command uses the following format:

/W[P] xx [Enter]

Where:

P   Is the command option to display port passwords. Note that when this option is included (e.g. **/WP 5**), the Port Parameters Screen will display the Port Password, if defined. (Supervisor Mode Only).

xx   is the desired port number. If the letter "N" is entered in place of a port number, the /W command will display parameters for the Network Port.

Note: When the command mode is accessed via the Network Port using a Port (User) password, the /W command will only display the Sequence Disconnect, Logoff Character, and the status of the Accept Break item.

7. Operation

7.1. Any-to-Any Mode

Any-to-Any Mode Ports can be connected to other Any-to-Any, Passive, Buffer, or Modem Mode Ports by accessing Command Mode and issuing the /C Command. All ports can be configured for the Any-to-Any Mode. Note that the Network Port is always configured for Any-to-Any Mode.

7.1.1. Port Connection and Disconnection

The CMS provides communication between devices without the requirement that both devices use the same communication parameters. This allows you to connect devices that use dissimilar baud rates, parity, handshake, and etc.. The CMS converts data rates and other parameters, eliminating the need to select common parameters for all connected devices.

7.1.1.1. Connecting Ports

Two different types of connections can be made between CMS ports; Resident Connections and Third Party Connections.

- **Resident Connections:** Your resident port issues a /C command to connect to a second port. For example, Port 4 issues the /C command to connect to Port 5.

- **Third Party Connections:** (Supervisor Mode Only) Your resident port issues a /C command to create a connection between two *other* ports. For example, Port 1 is your resident port, and Port 1 issues a command to connect Port 2 to Port 3.

Note:

- Third Party Connections can only be initiated from a port with Supervisor Level command capability.
- The RS232 Ports cannot initiate a connection to the Network Port.
- If a port has accessed Command Mode using the Port Password (User Mode), then that port will only be able to connect to other ports that share the same port password.

To Connect ports, proceed as follows:

1. Access the Command Mode. If the Password Prompt is displayed, enter your Supervisor or Port Password.

2. Invoke the **/C** command to connect the desired ports.

> . **Resident Connect:** To connect your resident port to another port, type **/C xx [Enter]**. Where **xx** is the number or name of the port you want to connect. The CMS will display the numbers of the connected ports, along with the command sequence that will be required in order to disconnect the two ports.
>
> **Example:** To connect your resident port to Port 8, type **/C 8 [Enter]**.
>
> b. **Third Party Connect:** (Supervisor Mode Only) To connect any two ports (other than your resident port), type **/C xx XX [Enter]**. Where **xx** and **XX** are two port names or numbers. The CMS will display the numbers of the two connected ports.
>
> **Example:** To connect Port 5 to Port 6, invoke the following command at a port with Supervisor Level command capability: **/C 5 6 [Enter]**.

Note:

- **Resident Connections:** RS232 Ports are *not* allowed to initiate a Resident Connection to the Network Port.
- **Third Party Connections:** RS232 Ports are not allowed to connect another port to the network port. For example, Port 1 is not allowed to connect Port 3 to the Network Port.

When the /C command specifies the port name, it is only necessary to enter enough letters to differentiate the desired port from other ports. Type an asterisk (*) to represent the remaining characters in the port name. For example, to connect your resident port to a port named "SALES", the connect command can be invoked as **/C S***, providing no other port names begin with the letter "S".

7.1.1.2. Disconnecting Ports

There are three different methods for disconnecting ports, the Resident Disconnect, the Third Party Disconnect, and the No Activity Timeout. Providing the Timeout feature is enabled, a No Activity Timeout will disconnect resident ports *or* third party ports.

> **Note:** Option 74 in the Port Parameters Menu determines how the DTR signal will react when the port disconnects. The DTR signal can either be held low, held high, or pulsed and then held high.

1. **Resident Disconnect:** Disconnects your resident port from another port. For example, if you are communicating via Port 3, and Port 3 is connected to Port 4, a Resident Disconnect would be used to disassociate the two ports. The CMS offers two different Resident Disconnect command formats; the Three Character Format and the One Character Format (for more information, please refer to Section 5.5.3.):

.   **Three Characters (Default):** Uses the format "**[Enter]LLL[Enter]**", where **L** is the selected Logoff Character. The Default Resident Disconnect Sequence is **[Enter]+++[Enter]**.

b. **One Character:** When the One Character Disconnect Sequence is selected, simply enter the selected Logoff Character once (Default = **+**). Note that it is *not* necessary to enter a carriage return before or after the Logoff Character.

c. If the default Resident Disconnect Sequence is not compatible with your application, both the command format and Logoff Character can be redefined via the Port Configuration menus, as described in Section 5.5.

2. **Third Party Disconnect:** (Supervisor Mode Only) The /D command is issued from your resident port to disconnect two third party ports. For example, if your Resident Port is Port 1, a Third Party Disconnect would be used to disconnect Port 3 from Port 4.

    .   The /D command uses the format: **/D xx XX [Enter]**, where **xx** and **XX** are the numbers of the ports that you wish to disconnect, if an **N** is entered, the command will disconnect the Network Port.

    b. The /D (Disconnect) command can only be invoked by a port with access to Supervisor Level commands.

    c. The /D command can specify both connected ports, or either of the two ports. For example, if Port 1 is your resident port, any of the following commands can be used to disconnect Port 3 from Port 4:

                          /D 3 4 [Enter]
                                or
                           /D 3 [Enter]
                                or
                           /D 4 [Enter]

3. **No Activity Timeout:** Providing the Timeout feature is enabled at either connected port, the No Activity Timeout can disconnect Resident Ports, *or* Third Party Ports.

    .   **RS232 Ports:** To configure the Timeout Feature for the RS232 Ports, invoke the /P command to display the Port Configuration Menu for the desired port as described in Section 5.5.3. Option 11 enables and defines the Timeout Feature.

    b. **Network Port:** To configure the Timeout Feature for the Network Port, invoke the /N command to display the Network Port Configuration Menu as described in

Section 5.5.4. Option 15 enables and defines the Timeout Feature.

    c. When the Timeout Feature is enabled, the port will automatically disconnect if no data is received for the defined Timeout Period.

7.1.2. Defining Hunt Groups

A Hunt Group creates a situation where the CMS will scan a group of ports and connect to the first available port in the group. Hunt Groups are created by assigning identical or similar names to two or more ports. Hunt Groups can be defined using Any-to-Any, Passive, Buffer, or Modem Mode Ports. Note that the Network Port *cannot* be included in Hunt Groups.

1. Access the Command Mode. If the password prompt is displayed, enter the Supervisor Password.

2. Invoke the /P command to access the Port Configuration Menu for the desired Port(s) as described in Section 5.5.3. For example, to configure Port 4, type **/P 4 [Enter]**.

3. From the Port Configuration Menu, select item 1 to define the Port Name.

4. Repeat steps 2 and 3 above to assign identical names to the other ports in the Hunt Group. For example, a series of ports in a group could all be named "SERVER".

5. To connect to the next available port in the hunt group, invoke the /C command using the port name to specify the desired group. For example, **/C SERVER [Enter]**.

6. Your port will be connected to the first available port in the group. If all ports are presently connected, the CMS will respond with the "BUSY" message.

7. It is only necessary to enter enough letters of the port name to differentiate the Hunt Group ports from other ports. Type an asterisk (*) to represent the remaining characters in the port name. For example, to connect your resident port to the first available port in a group of ports named "SALES1", "SALES2", and "SALES3", the connect command can be invoked as **/C S* [Enter]**, providing no other port names begin with the letter "S".

Hunt Group port names must be unique. Otherwise, ports with similar names will also be included in the Hunt Group.

Hunt Group Example 1:

1. Ports 1 and 2 are Modem Mode ports, and modems are installed at both ports. Port 1 is named "MODEM1" and Port 2 is named "MODEM2".

2. Your resident port is Port 4. To connect to the first available Modem, access the

Command Mode and type **/C MODEM*** **[Enter]**.

Hunt Group Example 2:

1. Ports 3, 4, and 5 are Any-to-Any Mode ports. All three ports are named "SERVER".

2. Your resident port is Port 1, and you want to connect Port 2 to the first available server, access the Command Mode and type **/C 2 SERVER** **[Enter]**.

7.2. Passive Mode

Passive Mode Ports function the same as Any-to-Any Mode Ports, but do not allow access to Command Mode. A Passive Mode Port can communicate with other ports, but *cannot* enter Command Mode, and therefore cannot invoke commands to redefine port parameters, display status, and etc.

Passive Mode Ports can be connected by accessing the Command Mode from a free Any-to-Any Mode or Modem Mode Port, and invoking the Third Party Connect or Resident Connect Command as described in <u>Section 7.1.1.2</u>. Passive Mode ports will not buffer data, except during baud rate conversion.

Note:

- A Passive Mode Port is not allowed to access the Command Mode.
- In order to ensure supervisor access to important command functions, the Passive Mode is not available to Ports 1 and 2 (SetUp Ports).
- The Passive Mode is not available at the Network Port.

7.3. Buffer Mode

Ports configured as Buffer Mode ports will collect data from the connected device and store it in the CMS's statically allocated memory. Each CMS port features a fixed length, fixed position data buffer.

The Buffer Mode allows collection of data from various devices without the requirement that all devices use the same communication parameters (e.g. baud rate, parity, etc.).

Notes:

- Buffer Mode Ports cannot access the Command Mode.
- In order to ensure supervisor access to important command functions, the Buffer Mode is not available to Ports 1 and 2 (SetUp Ports).
- The Buffer Mode is not available at the Network Port.

7.3.1. Reading Data from Buffer Mode Ports

To retrieve data from Buffer Mode Ports, you must first determine which port buffers contain data. To check port buffers for stored data, access the Command Mode and type **/S [Enter]** to display the Port Status Screen.

To retrieve data from buffer memory, go to a free Any-to-Any or Modem Mode Port, access the Command Mode (Supervisor Level), and issue the /C command using the following format:

/C xx [Enter]

Where **xx** is the number or name of the port buffer to be read.

If the port's buffer is empty, the CMS will send a message which reads "Connected xx, Buffer Empty"; where "xx" is the port number. If the buffer contains data, the CMS will display a prompt that offers four options:

- **Next Screen:** To scroll through data one screen at a time, press the **[Space]** bar. Each time the space bar is pressed, the next full screen of data will be sent.

- **Scroll All:** To send all data without pausing, press **[1]**.

- **Skip/Connect:** To connect to the buffer port without sending stored data, press **[2]**.

- **Erase/Connect:** To connect to the buffer port and erase stored data, press **[3]**. Note that buffered data will be erased immediately and will not be sent.

    Note: All four of these options also allow pass-through communication with the device connected to the Buffer Mode port.

To clear data from the buffer, use the Erase/Connect option, or go to a free Any-to-Any or Modem Mode Port with Supervisor Level command capability, and issue the /E (Erase Buffer) command using the following format:

/E xx [Enter]

Where **xx** is the number or name of the port buffer to be cleared.

7.3.2. Port Buffers

The Status Screen lists the amount of Buffer Memory currently used by each port. The CMS uses buffer memory in two different ways, depending on the user-selected port mode.

- **Any-to-Any, Passive, and Modem Mode Ports:** When two ports are communicating at dissimilar baud rates, the buffer memory prevents data overflow at the slower port.

- **Buffer Mode Ports:** Stores data received from connected devices. The user issues a

connect command (/C) from an Any-to-Any Mode or Modem Mode port to retrieve data.

If the Status Screen indicates an accumulation of data, the /E (Erase Buffer) command can be invoked to clear the buffer.

7.4. Modem Mode

In addition to allowing data transfer, the Modem Mode also provides additional functions specifically related to modem communication. A Modem Mode Port can perform all functions normally available in Any-to-Any Mode. The Modem Mode is available to all CMS ports except the Network Port.

When the Modem Mode is selected, the port configuration menu (command /P) will display three additional prompts, which allow the user to re-define the modem reset string, initialization string, and hang-up string.

When the Modem Mode is selected for a port with Supervisor Level command access, the Supervisor Password should be defined. This will discourage unauthorized access to higher command functions.

When a call is received, the unit will prompt the caller to enter a password. The CMS allows three attempts to enter a valid password. If the correct password is not entered in three attempts, or if the user does not respond to the password prompt within 30 seconds, the modem will disconnect.

The password can be defined and enabled by invoking the /P command as described in Section 5.5.

Note:

- When a Modem Mode Port exits Command Mode, or the DCD line is lost while the Command Mode is active, the CMS will pulse the DTR line to the modem. The unit will then send the user-defined modem command strings to make certain the modem is properly disconnected and reinitialized.
- When an external modem is installed at a CMS port, other ports can use the modem for calling out. To call out, invoke the /C command to connect to the port, and then access the modem as you normally would.

8. Saving and Restoring Configuration Parameters

After the CMS has been properly configured, parameters can be downloaded and saved as an ASCII text file. Later, if the configuration is accidentally altered, the file with the saved parameters can be uploaded to automatically reconfigure the unit without the need to manually assign each parameter.

Saved parameters can also be uploaded to other CMS units. This allows rapid set-up when

several units will be configured with the same parameters.

The "Save Parameters" procedure can be performed from any terminal emulation program (e.g. ProComm, Crosstalk, Hyperterminal, etc.), that allows downloading of ASCII files.

8.1. Sending Parameters to a File

1. Start ProComm and access the CMS Command Mode. If the password prompt is displayed, enter the Supervisor Password.

2. When the CMS command prompt appears, type **/U** and press **[Enter]**. The CMS will prompt you to configure your terminal emulation program to receive an ASCII download. Set your terminal emulation program to receive an ASCII format download, and the specify a name for a file that will receive the saved parameters (e.g. CMS.PAR).

3. When the terminal emulation program is ready to receive the file, return to the CMS Save Parameter File menu, and press **[Enter]** to proceed with the download. CMS parameters will be saved on your hard drive in the file specified in Step 2 above.

4. The CMS will send a series of ASCII command lines which specify the currently selected CMS parameters. The last line of the file should end with a "**/G-00**" command.

8.2. Restoring Saved Parameters

This section describes the procedure for using ProComm to send stored parameters to the CMS.

1. Start your terminal emulation program and access the CMS Command Mode; if the password prompt is displayed, enter the Supervisor Password.

2. Configure your terminal emulation program to upload and ASCII text file.

3. Upload the ASCII text file with the saved CMS parameters. If necessary, key in the file name and directory path.

4. Your terminal emulation program will send the ASCII text file to the CMS. When the terminal program is finished with the upload, make certain to terminate the Upload mode.

Notes:

● If the CMS detects an error in the parameters file, it will respond with the "Invalid Parameter" message. If an error message is received, carefully check the contents of the parameters file, correct the problem, and then repeat the Upload procedure.

● When the configuration file is sent to the CMS via telnet, the unit's IP

Address, Subnet Mask, and Gateway Address cannot be altered.

5. Type **/S** and press **[Enter]**, the CMS Status Screen will be displayed. Check the Status Screen to make certain the unit has been configured with the saved parameters.

9. Upgrading CMS Firmware

When new, improved versions of the CMS operating firmware become available, the "Upgrade Firmware" function can be used to update the CMS unit. Updates can be uploaded via Setup Ports One and Two, or via the Network Port.

> **Note:** All other ports will be disabled during the firmware upgrade procedure.

1. Obtain the update file. Firmware modifications can either be mailed to the customer on a 3.5" diskette, or downloaded from WTI via modem. Place the diskette in your diskette drive and/or copy the file to your hard drive.

2. Access the CMS command mode. If the password prompt is displayed, key in the Supervisor Password. The Upgrade Firmware feature is only available in Supervisor Mode.

3. When the CMS command prompt appears, type **/UF** and then press **[Enter]**. The CMS will display a screen which offers the following options:

   . **Continue Upload and Keep Current Parameters:** To proceed with the upgrade, while retaining current, user-defined parameters, type **1** and press **[Enter]**. All parameter settings will be restored when the upgrade is complete.

   b. **Continue Upload and Default System:** To proceed with the upgrade, and reset parameters to default settings, type **2** and press **[Enter]**. When the upgrade is complete, all parameters will be set to default values.

   > **Note:** When the upgrade is performed via the Network Port, the CMS will *not* default the IP Address, Subnet Mask, or Gateway Address. This allows the telnet connection to be re-established after the upgrade procedure is complete.

   c. **Abort Upload:** To cancel the upgrade and return to the command prompt, type **3** and press **[Enter]**.

4. Use your communication program's (e.g. ProComm's) upload function to transfer the upgrade firmware to the CMS unit. Select ASCII file format, and then specify the filename and directory location where the firmware upgrade file resides.

   > **Note:** The Upload function will time-out after one minute of inactivity. If the

function times out, type **1** and press **[Enter]** to continue, or press **[Esc]** to abort.

5. If the upload is successful, the CMS will prompt the user to continue the upgrade or abort.

   . **Upgrade:** To continue with the upgrade, type **1** and press **[Enter]**. CMS will erase the previous firmware, move new firmware from data flash to program flash memory, calculate and store the new checksum, and reboot. Do not attempt to reconnect to the CMS until the RDY indicator blinks to indicate the process is complete.

   b. **Abort:** To abort the procedure, type **2** and press **[Enter]**.

6. **Incomplete Upload:** If the upload is interrupted, times-out, or if the file is corrupted during transfer, the CMS will display a screen which asks for user confirmation before proceeding. To proceed, type **1** and press **[Enter]**, then return to Step 4 above.

7. **Emergency Recovery:** In the rare event that the CMS operating system becomes corrupted during installation, front panel indicators will blink five times and the unit will automatically switch to Emergency Recovery Mode. Please contact WTI Customer Service for further instructions.

When firmware upgrades are available, WTI will provide the necessary files via modem or mailed diskette. At that time, an updated Users Guide or addendum will also be available.

10.   Command Reference Guide

10.1. Command Conventions

The commands described in this section conform to the following conventions:

- **Slash Character:** Most CMS commands begin with the Slash Character (**/**).

- **Apply Command to All Ports:** When the asterisk character is entered as the argument of the **/D** command (Disconnect Port), or the **/E** command (Erase Buffer) the command will be applied to all ports. For example, to erase all port buffers, type **/E * [Enter]**.

- **Port Name Wild Card:** It is not always necessary to enter the entire port name. Port names can be abbreviated in command lines by entering the first character(s) of the name followed by an asterisk (*****). For example, a port named "SERVER" can be specified as "**S***". Note however, that this command would also be applied to any other port name that begins with the letter "S".

- **Suppress "Sure?" Prompt:** When the **/D** (Disconnect Port), **/E** (Erase Buffer), or **/I**

(Default and Test Unit) commands are invoked, the **/Y** option can be included in the command line to override the "Are you Sure (y/n)?" prompt. For example, to disconnect Port 8 without displaying the "Sure?" prompt, type **/D/Y 8 [Enter]**.

- **Enter Key:** All commands are invoked by pressing **[Enter]**.

- **Command Mode:** CMS Ports will only recognize commands when the Command Mode has been activated. The Command Mode can be accessed from a free Any-to-Any or Modem Mode Port. To access the Command Mode, proceed as described in <u>Section 5.1</u>.

- **Connected Ports:** When two ports are connected, most CMS commands will not be recognized by either of the connected ports. The only exception is the Resident Disconnect Sequence (Default = **[Enter]+++[Enter]**).

- **Configuration Menus:** To exit from a configuration menu, you must press **[Esc]** or **[Ctrl]+[X]**.

10.2. Command Response

When commands are sent to the CMS, the unit can respond with either verbose (English Text) or terse messages (numeric / abbreviated). The default message type for all ports can be set to either terse or verbose using Option Switch Six.

After the unit is installed and configured, the port configuration commands (/P and /N) can specify an individual response format for each port. In addition to the Terse and Verbose response modes, the port configuration commands can also select the Quiet Mode. When the Quiet Mode is selected, the port will *not* send messages in response to commands.

The table below summarizes the various response messages for both the Terse and Verbose modes.

Terse	Verbose
0	OK
0	RAM Test Passed
1	Connected *
2	Busy
3	Disconnected
4	Invalid Command
5	Are You Sure (Y/N) ?
6	Invalid Parameter

7	Invalid Syntax
8	Invalid Access
9	Enter Site ID:
A	Aborted
B	Enter Password:
C	Invalid Password
D	RAM Test Failed at *
E	Inactivity Timeout, Disconnected
F	Data in Buffer from Previous Connection ... Re-Enter Logoff Sequence to Purge Buffer.
G	Asleep

* These verbose Response Messages include additional information not provided by terse Response Messages.

10.3. Command Summary

Function	Command Syntax	Command Availability	
		Supervisor	User
Enter Command Mode	**[Enter]**	X	X
Exit Command Mode	`/X` **[Enter]**	X	X
Help Menu	`/H` **[Enter]**	X	X
Display Site ID	`/J` **[Enter]**	X	X
Display Port Status	`/S[P]` **[Enter]**	X **(1) (2)**	X **(1)**
Display Port Diagnostics	`/SD` **[Enter]**	X **(1)**	X **(1)**
Display Network Status	`/SN` **[Enter]**	X	
Display Port Parameters (Who)	`/W[P] [n]` **[Enter]**	X **(2)**	X **(3)**
Set System Parameters	`/F` **[Enter]**	X	
Set Network Port Parameters	`/N` **[Enter]**	X	
Set RS232 Port Parameters	`/P <x>` **[Enter]**	X	
Copy RS232 Port Parameters	`/CP` **[Enter]**	X	
Connect	`/C <x> [x]` **[Enter]**	X	X **(4)**
Resident Disconnect **(5)**	**[Enter]+++[Enter]**	X	X
Third Party Disconnect **(6)**	`/D[/Y] <x> [x]` **[Enter]** `/D[/Y] *` **[Enter]**	X	

Erase Buffer	`/E[/Y] <x> [x]` **[Enter]** `/E[/Y] *` **[Enter]**	X	
Reset Network Port	`/T` **[Enter]**	X	
Default & Test	`/I[/Y]` **[Enter]**	X	
Save Parameters	`/U` **[Enter]**	X	
Upgrade Firmware	`/UF` **[Enter]**	X	

(1) Supervisor Mode displays parameters for all ports;
User Mode only displays parameters for the ports allowed by the Port Password.

(2) To display Port Passwords, include the "P" Option. (Supervisor Only).

(3) A port with "User" command capability can only view its own parameters. A User Port *cannot* view parameters for other ports.

(4) A User Port *cannot* perform a Third Party Connect.

(5) Resident Disconnect: Disconnects your resident port from another port. Note that the Resident Disconnect Sequence can be redefined via the Port Configuration Menus.

(6) Third Party Disconnect: Disconnects two or more nonresident ports. Must be issued from a third port with Supervisor command capability.

10.4. Command Set

This Section provides more detailed information on all CMS commands, sorted alphabetically by name.

[Enter] Enter Command Mode

In order to set parameters or connect ports, you must first access the command mode as described in Section 5.1. When the Command Mode is inactive (port asleep), the port will only respond when the **[Enter]** key is pressed without any characters preceding it. If the Supervisor Password (command /F) has been defined, the unit will require a password before allowing access to Command Mode.

Availability: Supervisor / User
Format: **[Enter]** (Press **[Enter]** twice if other characters have already been typed).
Response: The Port Status Screen will be displayed, followed by the "CMS>" command prompt.

[Enter]+++[Enter]   Resident Disconnect Sequence

The Resident Disconnect Sequence is issued to disconnect your resident port from another port. For example, if you are communicating via Port 3, and Port 3 is connected to Port 4, the Resident Disconnect Sequence would be used to disconnect Port 3 from Port 4. Although the default Resident Disconnect Sequence is **[Enter]+++[Enter]**, the command format and Logoff Character can also be redefined via the Port Configuration Menus as described in Section 5.5.3. Note that a one character disconnect command can also be selected.

Availability: Supervisor / User
Format: [Enter]xxx[Enter]

Where "**x**" is the selected Logoff Character, and the default character is "**+**".

Response:

Verbose: The CMS will send the "Disconnected" message, followed by the Port Status Screen.

Terse: 3

/C   Connect

Establishes a bi-directional connection between two ports. For more information and command line examples, please refer to Section 7.1. There are two different types of port connections:

- **Resident Connect:** If the /C command specifies one port name or number, your resident port will be connected to the specified port.

- **Third Party Connect:** If the /C command specifies two port names or numbers, the unit will connect the two ports indicated. A Third Party Connect command must be issued from a third port with "Supervisor" command capability. "User" ports *cannot* initiate a Third Party Connect.

Note:
- Ports with "User" command capability can only connect to ports that share the same Port Password.
- Ports with "Supervisor" command capability are allowed to connect to all other ports.

Availability: Supervisor / User
Format: /C <x> [x] [Enter]

Where **x** is the number or name of the port(s) to be connected.

Response:

Verbose: Connected **xx**, when a Resident Connection is initiated, the CMS will also display the currently selected Resident Disconnect Sequence for your port.

Terse: 1

/CP   Copy RS232 Port Parameters

Allows quick set-up when all CMS RS232 ports will be configured with the same or similar parameters. When the /CP command is invoked, the CMS will display a menu that is used to select common port parameters, which can then be copied to all CMS RS232 ports. For more information, please refer to Section 5.6.

Availability: Supervisor Only
Format: /CP [Enter]
Response: Displays Copy Parameters Menu

/D   Third Party Disconnect

Invoke the /D command at your resident port to disconnect two other ports. The /D command cannot be used to disconnect your resident port. To disconnect your resident port, issue the Resident Disconnect Sequence or wait for the Timeout Period to elapse (if enabled).

Availability: Supervisor Only
Format: /D[/Y] <x> [x] [Enter]

Where:

/Y (Optional) suppresses the "Sure?" prompt.

x Is the number or name of the port(s) to be disconnected. To Disconnect all ports, enter an asterisk. To disconnect the Network Port, enter an "**N**".

Response:

Verbose: "Are you Sure (y/n)?", if Y, unit will respond with "Disconnected".

Terse: 5, if Y, unit will respond with 3.

Example: To disconnect Port 2 from Port 3 without the "Sure?" prompt, access the Command Mode from a third port with "All" command capability and type one of the following commands:

/D/Y 2 [Enter] or **/D/Y 3 [Enter]**

/E   Erase Buffer

Erases data from the buffer for a specified port or several ports. Note that erased data *cannot* be

recovered.

Availability: Supervisor Only
Format: /E[/Y] <x> [x] [Enter]

> Where:
>> **x** Is the number or name of the port buffer(s) to be cleared. To erase buffers for all ports, enter an asterisk.
>>
>> **/Y** (Optional) Suppresses the "SURE? (Y/N)" prompt.

Response:

> **Verbose:** "Are You Sure (y/n)?", if Y, the unit will respond with "OK".
>
> **Terse:** 5, if Y, the unit will respond with 0.

Example: To clear the buffer for Port 3, access the Command Mode from a port with "All" command capability, and type **/E 3 [Enter]**.

/F   Set System Parameters

Displays a menu which is used to define the Site ID message and Supervisor Password. When the Supervisor Password is defined, the CMS will display a password prompt before allowing access to command mode. For more information, refer to Section 5.4.

> **Note:** Make certain to record your Supervisor Password for future reference. If the Supervisor Password is lost or forgotten, you will not be able to access Supervisor Level commands.

Availability: Supervisor Only
Format: /F [Enter]
Response: Displays System Parameters Menu

/H   Help

Displays a Help Screen, which lists all CMS commands along with a brief description of each command.

Availability: Supervisor / User
Format: /H [Enter]
Response: Displays Help Screen. Note that the User Level Help Screen does not include Supervisor Level Commands.

/I   Default and Test

Tests internal memory and initializes the unit with the default parameters specified by the Option

Switches.

> **Caution: When /I is invoked, the CMS will revert to the parameters specified by the Option Switches. Command selected parameters will be lost.**

Availability: Supervisor Only
Format: /I[/Y] [Enter]

Where **/Y** is a command option used to suppress the "Sure?" prompt.

Response:

Verbose: "Are You Sure (y/n)?", if Y, memory test and initialization begins.

Terse: 5, if Y, memory test and initialization begins.

/J   Display Site ID

Displays the user-defined Site I.D. message.

Availability: Supervisor / User
Format: /J [Enter]
Response: Displays Site I.D. Message

/N   Set Network Port Parameters

Displays a menu which is used to define communication parameters for the Network Port. Also allows access to the IP Security function, which is used to restrict network access by unauthorized IP addresses. For more information on selecting network parameters, please refer to Section 5.5.4.

Availability: Supervisor Only
Format: /N [Enter]
Response: Displays Network Parameters Menu

/P   Set RS232 Port Parameters

Displays a menu which allows the user to select options and parameters for the selected port. Section 5.5.3 describes the procedure for defining port parameters.

Availability: Supervisor Only
Format: /P [x] [Enter]

Where **x** is the number or name of the port to be configured. If the port number or name is not specified, the CMS will display the configuration menu for your resident port.

Response: The Port Parameters Menu is displayed.

/S   Display Port Status

Displays the Port Status Screen, which lists current conditions and parameters for all ports. Normally, the Port Status Screen will not display Port Passwords; the Password column will read either "defined" or "undefined", depending upon whether or not the password for each port has been specified. When the Supervisor Mode is active, the /SP command offers the option to either display or suppress Port Passwords. For more information on the Port Status Screen, please refer to Section 6.1.

Availability: Supervisor / User
Format: /S[P] [Enter]

> When the "P" option is included (e.g. **/SP**), the Port Status Screen will lists the password for each port, if defined. (Supervisor Mode Only).

Response: Displays Port Status Screen

/SD   Display Port Diagnostics

Provides more detailed information regarding the operational status of each port. Note that in User Mode, this screen will only display parameters for the ports that are allowed by the Port Password that was entered at log in. For More information on the Port Diagnostics Screen, please refer to Section 6.2.

Availability: Supervisor / User
Format: /SD [Enter]
Response: Displays Port Diagnostics Screen

/SN   Display Network Status

Displays the Network Status Screen, which lists current conditions and parameters for the Network Port. For more information on the Network Status Screen, please refer to Section 6.3.

Availability: Supervisor Only
Format: /SN [Enter]
Response: Displays Network Status Screen

/T   Reset Network Port

Resets the NIC card, and breaks the network connection to the unit. Note that when this

command is invoked, the network connection will be reset without warning, and must then be re-established in order to communicate with the unit via Network.

Availability: Supervisor Only
Format: **/T [Enter]**
Response: None (NIC Card is reset, Network Connection is broken)

/U   Save Parameters

Sends CMS configuration parameters to an ASCII text file as described in Section 8.

Availability: Supervisor Only
Format: **/U [Enter]**
Response: The CMS will send a series of command lines.

/UF   Upgrade Firmware

When new versions of the CMS operating firmware become available, this command is used to update the existing firmware as described in Section 9. Note that this command will only function at the Network Port and at Setup Ports One and Two.

Availability: Supervisor Only
Format: **/UF [Enter]**
Response: The CMS will display a menu which offers the options to retain existing CMS parameters, default parameters, or abort the upgrade procedure.

/W   Display Port Parameters (Who)

Displays configuration of an individual port, but does not allow the user to change parameters. Ports with User Level command capability cannot display parameters for other ports. Normally, the Port Parameters screen will not include the Port Password. Note however, that when the Supervisor Mode is active, the /WP option can be used to display the password for the target port. For more information, please refer to Section 6.4.

Availability: Supervisor / User
Format: **/W[P] [x] [Enter]**

Where:

P When the "**P**" option is included (e.g. **/WP 5**), the Port Parameters screen will list the password for each port, if defined. (Supervisor Mode Only).

x Is the port number or name. To display parameters for the Network Port, enter an "**N**". If the "**x**" argument is omitted, parameters for your resident port will be displayed.

Response: Displays port parameters.

Example: To display parameters for a port named "SERVER", access the Command Mode from a port with Supervisor Level command capability, and type **/W SERVER [Enter]**.

/X Exit Command Mode

Exits Command Mode, When issued at the Net Port, also ends the telnet session. Note that exiting from Command Mode will not terminate port connections.
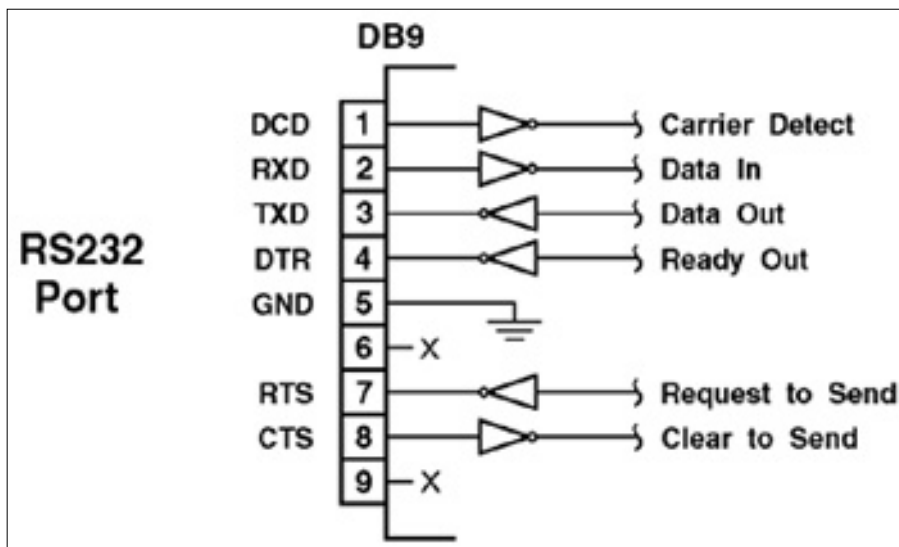
- **Any-to-Any Mode:** Exits Command Mode.

- **Modem Mode:** Disconnects and resets modem, hang-up message is sent, hardware line to modem drops for 500 ms, and reset message is sent.

Availability: Supervisor / User
Format: /X [Enter]
Response: Disconnected

Appendix A. RS232 Port Interface

Figure A.1: RS232 Port Interface

DCD and DTR hardware lines function as follows:

1. When connected:

   . If either port is set for Modem Mode, the DTR output at either port reflects the DCD input at the other end.

   b. If *neither* port is set for Modem Mode, DTR output is held high (active).

2. When not connected:

   . If the port is set for Modem Mode, upon disconnect DTR output is pulsed for 0.5 seconds and then held high.

   b. If the port is *not* set for Modem Mode, DTR output is controlled by the DTR Output option (Parameters Menu, Option 74). Upon disconnect, Option 74 allows DTR output to be held low, held high, or pulsed for 0.5 seconds and then held high.

Appendix B.   Specifications

- **RS232 Port Interface:** 16 RS232 serial inputs use DB9 connectors configured as DTE ports.
- **Network Interface:** 10Base-T Ethernet, RJ45
- **Coding:** Asynchronous, 7/8 bits ASCII.
- **Parity:** Even, Odd, None
- **Stop Bits:** 1 or 2.
- **Data Rate:** 300 to 115.2K bps (all standard rates).
- **Flow Control:** XON/XOFF, RTS/CTS, Both, or None.
- **Timeout:** No activity timeout disconnects port. 1, 5, 10, 15, 30 seconds, 1, 5, 15, 30, 90 minutes.
- **Memory:** Stores Parameters and captured data. Non-volatile 512K SRAM buffer memory. Statically allocated.
- **Break:** Accept Break or Refuse Break
- **Option Switch:** 8 position DIP switch, selects default settings for baud rate, flow control, response message format, and command echo.
- **LEDs:** Power On, Ready, Net, Data Activity for Ports 1 through 16.
- **Temperature:** 0°C to 45°C (operating)
- **Power:**
  - ❍ **AC Version:** IEC-32 Inlet, 115/230 VAC, 50/60 Hz, 5 watts
  - ❍ **DC Version:** Terminal Strip (#6-32), -48 VDC, 0.2 Amp Max.
- **Size:** 2.8" x 17" x 6.8" (H x W x D)
- **Weight:** 8 lbs. shipping weight
- **Humidity:** 10 to 90% RH, Non-Condensing
- **Venting:** Side vents are used to dissipate heat generated within the unit. When mounting the unit in an equipment rack, make certain to allow adequate clearance for venting.

Appendix C.   Customer Service

Customer Service hours are from 8:00 AM to 5:00 PM, PST, Monday through Friday. When calling, please be prepared to give the name and make of the unit, its serial number and a description of its symptoms. If the unit should need to be returned for factory repair it must be accompanied by a Return Authorization number from Customer Service.

<div align="center">

WTI Customer Service
5 Sterling
Irvine, California   92618

949-586-9950
Toll Free: 1-800-854-7226
Email: service@wti.com

</div>

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